

particular excellence in the method of language-teachers. I refer to the practice of making the students acquainted with the works of great writers at the earliest possible period. I should like to see fairly advanced classes of chemical and other students, in schools and elsewhere, reading, with assistance, some of the more suitable memoirs of such men as Davy, Graham, and Faraday. I do not advocate the complete abandonment of text-books, but I should rejoice greatly if their use could be considerably restricted and something better substituted. Has not this neglect of the original writings of great workers by our teachers something to do with the subsequent neglect of research by so many of their pupils? There is of course this practical difficulty in the way of what I propose—that original memoirs are not at present obtainable in a form in which they can be put in the hands of whole classes of students. If my suggestion should prove acceptable to even a few teachers however, that is a difficulty which could be very easily surmounted.

(5) When any one proposes to himself a change in his mode of teaching, unless his position is quite exceptional, he always finds himself confronted by one solid difficulty, viz. public examinations of one kind or another. Teachers at first inspired the examiners. Now they find themselves too often helpless before them. In the face of our various examining Boards individuals are nearly powerless. The time seems to have come when an association of science-teachers for the improvement of science-teaching is a real necessity—something more or less resembling the Association for the Improvement of Geometrical Teaching. Such a body would often be invaluable. It could, by the appointment of committees, and perhaps by pecuniary help, promote such experiments as I have suggested in Paragraph (4). In cases such as the recent unfortunate action of the War Office, it might be expected to do good work by replacing individual by organised action. And it could hardly fail, by bringing teachers and examiners into contact, to do much to make advances in teaching more possible than at present.

My various remarks on so many points have necessarily been brief and incomplete. I could not, in the form of a letter, go fully into questions of advantage, disadvantage, and difficulty. I shall have amply attained the object I have had in view if I have helped to draw attention to these important matters.

W. A. SHENSTONE

### Do Flying-Fish Fly or Not?

I HAVE crossed the Atlantic and Indian Oceans many times and at different seasons of the year, but until my last voyage to Calcutta I was unable to answer this question positively. For days together, aided at times by a powerful field-glass, I have endeavoured to establish satisfactorily whether these nimble little fish used their membranous wings after rising above the surface of the sea or not. An old and valued friend, the late Charles Kingsley, on his voyage to the West Indies, so graphically painted in the pages of "At Last," records his opinion in favour of the wings being employed as a means of propulsion through the air after the fish quit their more natural element, and I certainly inclined to the same belief, although, owing to the "ever-vexed" condition of the Atlantic, I found accurate observation impossible. In the Indian seas the fish appear at rarer intervals, and limit correspondingly the chances of watching their movements.

On a blazing afternoon in May last, on board the steamer *India*, some hundred miles off the African coast on the way to Ceylon, I had the first and only opportunity I ever enjoyed of establishing beyond dispute this vexed question, which I am not aware has hitherto been settled. The sea was perfectly calm, covered here and there with a yellow scum which exhaled a fresh unpleasant smell like a beach covered with sea-weed at low water. From the spar-deck above the cabins, which were fitted up in the fore-part of the ship, I could descry at frequent intervals shoals of flying-fish rising and apparently fluttering from 50 to 100 yards before dipping again into the mirror-like surface of the ocean. Along with several of the passengers—some of them provided with field-glasses—I vainly endeavoured to make certain whether the fish did or did not make use of their wings after leaving the water. Opinions were divided, for, owing to the rapid motion of the fish, it was impossible to keep any one of them long enough in the field of vision. It occurred to some of us at length to look over the bows of the steamer, and there we saw a sight not soon to be forgotten. The flying-fish appeared frequently shooting upwards in large

numbers from the blue glassy depths directly beneath us, as the shoals were disturbed by the vessel's cutwater, and their every movement plainly discernible while under water and from the moment they rose "winnowing the waving element" with expanded wings and tail, bent on escaping the pursuing craft, until they dipped again into the sea for shelter or to obtain fresh impetus for continued flight. I satisfied myself, and so did my fellow-watchers, that after a certain number of strokes with wings and tail—from twenty to thirty, varying with the dimensions of the fish—which we repeatedly counted, as they left corresponding impressions on the oily surface of the water, these appendages were not employed to accelerate, but merely to sustain, the flight while the fish remained in the air. The curved impressions left by the wings on the water appeared, as nearly as I could judge, from twelve to eighteen inches apart on either side of the fishes' course until clear of the water. The tail left no perceptible imprint, but could be clearly seen waving from side to side, adding doubtless considerably to the impulse. After rising out of the water the wings and tail remained ridged, but in some instances were slightly twisted to preserve the equilibrium. Occasionally a fish appeared to lose its balance in the hurry of escape, and toppled over in a ridiculous fashion.

The yellow scum also attracted attention, tinging the ripple at the bows a deep orange. I had some of it brought on board, and a fellow-passenger of an entomological turn placed some under a powerful microscope, but failed to determine the species to which it belonged. Ten years ago, near the same place, I observed the water assume a dirty yellow tinge, as though it had suddenly shoaled, while the same unpleasant smell was perceptible. The discoloration and smell I found to be due to the presence of vast quantities of animalcula, about a quarter of an inch long, semi-transparent, jointed like a cane, and about the thickness of a small needle.

ROBERT W. S. MITCHELL

8, Garden Reach, Calcutta

### Earthquake Measurements

I REGRET that Prof. Ewing should take so much to heart my criticisms of his results of earthquake registration. I think that if we can get a single movement instead of a double one we gain much by halving the errors of double registration, extra friction, complexity of calculation, &c., all causes that tend to increase the imperfection of the results.

Neither did I intend to disparage seismological investigations on the plain of Yedo, but it does seem to me that the first thorough study, such as Prof. Ewing and others have initiated, should be in a locality where the minimum of disturbing influences would be able to complicate the results. In fact, we should expect much more progress in arithmetic in a child which commences by learning to count than in another that is immediately put to study fractions. I should never suggest that one earth-shaken locality should be continuously studied more than another when once we have decided upon the most serviceable and accurate registering apparatus.

Now as a resident in a country continuously shaken by earthquakes, many of which are disastrous, and where investigators are few and far between, we want instruments that give the least complicated tracings possible if we are to find observers amongst inhabitants of the Italian provincial towns. The same thing holds good to a variable extent in other countries.

Again, hardly any one would accuse me of claiming entire originality for the principle in the apparatus described. For example, every one knows that the pendulum has been used as a seismograph for centuries even. All that I claim is a combination of different forms of actuating and registering apparatus, with a few novel introductions, for it is practically impossible to *invent*, in the true sense of the word, a new seismograph any more than a new locomotive.

Perhaps, in my critic's opinion, we have reached perfection in seismographic instruments, which it appears is not shared by many workers, as the continual new suggestions and modifications indicate, as does also the fact that throughout all the observing-stations so far instituted it is rare to find two provided with similar instruments.

In regard to Prof. Ewing's last paragraph, perhaps experience will determine whether my suggestions do really lie outside the sphere of practical seismology.

In conclusion I shall be happy to hear suggestions for any improvements from others, for in my own humble opinion we do not yet possess a single seismograph that reaches near to perfec-

tion (my own of course included), so that we may still consider the instrumental investigation of earthquakes far from a settled matter, and one to be more fully worked out.

Naples, November 10 H. J. JOHNSTON-LAVIS

### Autumn Flowering

REFERRING to your article on autumn flowering (p. 13), I may mention that my garden primroses are now flowering again, and a laburnum is in flower in the garden of one of the houses on this road. I was in Paris in September 1861, and saw many horse-chestnuts in flower. The summer of 1861 was unusually warm and dry on the Continent, though I believe not in the British Islands.

JOSEPH JOHN MURPHY  
2, Osborne Park, Belfast, November 14

### The Northernmost Extremity of Europe

"A NORWEGIAN" (NATURE, p. 17) says that my description of Knivskjærødden as a low glaciated tongue of rock is hardly correct. As Norwegians ought to, and generally do, know more about their own land than do foreigners, I will quote Tönsberg, whose "Norge" is admitted as a high authority by all. Describing the scene displayed from the edge of the precipice of the North Cape, he says: "Beneath you at a distance of one-eighth of a mile, you see the long low Knivskjærlodde, which is undeniably the most northern part of Norway." The picture in his book (from a photograph) shows the northward extremity of this projection as washed over by the waves and its western side precipitous, as I saw it.

I sailed round it twice, more than ten years ago, halting in front of the North Cape for half an hour, and can only smile at the attempt to claim the northward supremacy of Knivskjærødden as a new discovery or one demanding further verification. In my copy of Munch's map (1852) it is shown as projecting a little further north than the North Cape.

Tönsberg further confirms my statement concerning the elevation of the neighbouring Arctic headlands, which "A Norwegian" also contradicts. Sverholtklubben, according to Tönsberg, is twenty-four Norsk feet higher than the North Cape. I should have added that the measurement I gave was in Norsk feet. Measured in English feet, the height of the North Cape is 1004 feet; that of Sverholtklubben 1029 feet at the edge of the cliff. There are about a dozen other headlands of similar magnitude between North Cape and the Varangerfjord.

W. MATTIEU WILLIAMS

### Breeding of the Quadrumana

HAVE any of your readers any experience of the production in captivity, of a second generation of any of the quadrumana? At least twelve out of about eighty species kept in the Zoological Gardens have bred during the past thirty years—the lemurs forming a large proportion—and the Rhesus more frequently than any other monkey. I presume that even a first generation of any of the anthropoids is unknown—except possibly of the gibbon (?). The disposition and moral character (in the widest sense) of no species of monkey whatever approaches that of the dog. May not this be due to the absence of inheritance (to which the dog owes so much) of the gradually accumulated cultivation of these qualities through association with man? The dog has enjoyed all these advantages. The monkey cannot, owing to the impossibility of rearing a succession of generations in captivity. Does the experience of your readers, who may have studied a first generation of monkeys, point to any improvement on the parent stock in disposition and character? So far as I have been able to judge from individuals in public collections, the mere mental power of these animals conspicuously exceeds that of any others. I should be glad to know whether this opinion is shared by those who have had more extended opportunities of observation.

ARTHUR NICOLS

### Fly-Maggots Feeding on Caterpillars

YOUR correspondent, Dr. E. Bonavia (p. 29), is mistaken in supposing the flies bred from his butterfly-chrysalis were "house-flies." They belong to the sub-family *Tachininae*, which is of very large extent, comprising several hundreds of species in Europe alone, and all probably parasitic in other insects. The "house-fly" belongs to the sub-family *Muscinae*. The mistake

is very pardonable, for there is often great external similarity in form, colour, and size, and it is one frequently made in this country.

R. MCLACHLAN  
Clarendon Road, Lewisham, S.E., November 14

IT might interest Dr. E. Bonavia (November 13, p. 29) to know that it is not an unusual circumstance to find the larvæ of the house-fly in the nests of *Vespa vulgaris* and *V. germanica* feeding upon the live bodies of the larvæ and pupæ of the wasps. Occasionally I have found nests in the summer-time quite deserted by the wasps, all the pupæ in the cells having been eaten by the maggots of house-flies and other *Diptera*.

F. W. ELLIOTT  
Buckhurst Hill, Essex, November 18

### The Sunday Question

THE announcement that, "after opening the Free Library on Sundays for two months, the Town Council have resolved to close it again in consequence of the small number of visitors," seems to indicate that the Town Council of Chester were as wise in deciding to close the Library as they had previously been in giving the people of Chester an opportunity of spending a portion of their day of rest in the Public Library, where those who do not possess libraries of their own can obtain access to the wisdom of the ages as stored in books.

If the facts are as stated, no one can complain of the action of the Chester Town Council, though some would have been glad to have seen a little more patience with people who for so long have been compelled to spend their Sundays when not at home either in the church, the public-house, or the streets, all of which may be attended with advantage and profit by free and intelligent men and women; but when men are driven to either of these places, what should be a blessing becomes in too many cases a curse.

However, as I have said, we have no right to complain of the Town Council of Chester closing the Public Library on Sunday if there is no considerable number of the people of the town desirous of using the institution on that day. In civilised communities representative authorities such as town councils and parliaments are only justified in spending public money on institutions when at least a considerable section of the community desires it.

The Sunday Society bases its claim for the Sunday opening of the British Museum, the South Kensington Museum, the Natural History Museum, the National Gallery, and the Bethnal Green Museum on the ascertained fact that very large sections of the community do desire to visit them on Sundays, and if it be replied that there are more people who have no such desire and therefore these institutions should be closed, I answer that that argument would close the whole of them on every day in the week, for no one will for a moment contend that a majority of the people of the United Kingdom have visited, or can possibly visit, these national exhibitions of the wonders of the universe and what we call its highest product—man.

But the benefit of these institutions is not confined to those who actually visit them. The sermon of the Puritan divine and the lecture at the mechanic's institute are alike indebted to the British Museum and the other institutions named.

Let the trustees of the British Museum follow the example of the Town Council of Chester and open the Museum on Sundays for two months, and the question, so far as the Sunday Society is concerned, will be settled for ever. I will venture to say that after such an experiment the British Museum would never again be closed on Sundays, and with such an example in the centre of the metropolis, no Sunday Society would be longer needed to advocate the opening of museums, art galleries, libraries, and gardens on Sundays.

The statement that at Keswick the "Sunday-opening experiment had been tried and abandoned" is true, but it should be explained that the Library at Keswick is not a public institution in the sense of being supported by rates and taxes, and is under the sole control of the vicar of the parish. It was the late vicar who closed the Library on Sundays, and I have the pleasure of announcing the fact that the Sunday-closing experiment has been tried and abandoned. The present vicar, the Rev. J. N. Hoare, did not decide to do this on his own authority, but he convened a special meeting of the Committee to consider the question,